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Fulfilling Multiple Intent Queries Using Compound Responses

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ABSTRACT

Information-seeking queries to a virtual assistant can often cover multiple facets of a given topic. For example, a query of the form “what is the latest on covid-19” can reasonably be answered with the latest epidemiological statistics, medical information of disease symptoms, news relating to disease spread, etc. No single interpretation of such a query is likely to meet all of the user's original information-seeking intent. This disclosure describes techniques for answering queries that can include multiple reasonable answers derived from different corpora. The techniques incorporate information from the different corpora and presents it in a manner that obviates the need for a user to understand finer distinctions between the corpora. Effectively, the techniques provide a *compound response* that is stitched together from available facts, related news stories, and other sources of information to cover the user’s information needs.

KEYWORDS

- Virtual assistant
- Compound response
- Information-seeking intent
- Multiple intents
- Query intent
- Knowledge corpus

BACKGROUND

Information-seeking queries to a virtual assistant (or other applications such as a search engine) can often cover multiple facets of a given topic. For example, users can ask information-seeking queries of the form: “what is the latest on `<topic>`?”

If `topic` is, for example, “covid-19,” then the above query can be fulfilled by one or more of: providing the latest covid-19 epidemiological statistics, providing the latest medical knowledge of the symptoms of the disease, providing news about the spread of the virus, providing information relating to various measures being implemented to combat its spread, by providing information relating to various stages (early, recent, etc.) of the pandemic, etc. No single interpretation of such a query is likely to meet all of the user's original information-seeking intent.

DESCRIPTION

This disclosure describes techniques for answering queries that can include multiple reasonable answers derived from different corpora. The techniques incorporate information from the different corpora and presents it in a manner that obviates the need for a user to understand finer distinctions between the corpora. Effectively, the techniques provide a *compound response* that is stitched together from available facts, related news stories, and other sources of information to cover the user’s information needs.

Per the techniques, a *compound routine* is defined as a virtual assistant task that includes performing a multiplicity of related actions or queries in sequence, with the transition between component actions being seamless and transparent to the end-user. A compound routine can be based upon or built atop existing virtual assistant features that enable users to perform actions or queries that repeat on a regular basis, e.g., habitually repeat in sequence the tasks “turn on the lights,” “tell me my appointments of today,” and “play me the news.”

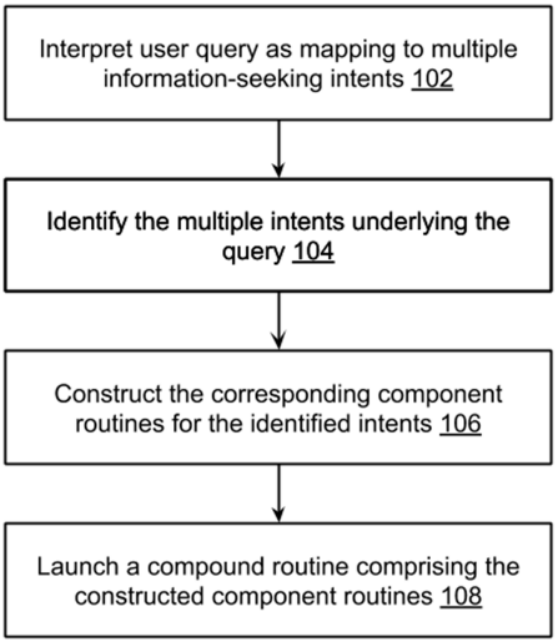

Fig. 1: Fulfilling information-seeking queries using compound responses

Fig. 1 illustrates fulfilling information-seeking queries using compound responses, per the techniques of this disclosure. A user query is interpreted as mapping to multiple information-seeking intents (102). The multiple intents underlying the query are identified (104). For example, for the query “what is the latest on covid-19?” the multiple intents can correspond to news, medical answers, etc. For each identified intent, a corresponding component routine is constructed (106).

A compound routine comprising the constructed component routines is launched (108) to generate a response to the query that includes information that addresses the multiple query intents. For example, different information sources such as medical databases, news sources, online multimedia repositories, dictionaries, etc. can be accessed to obtain the information that is responsive to the different query intents.

Alternatively, the user can be progressively queried over the successive intents included within the multiple implicit information-seeking intents present in the query.

Further to the descriptions above, a user may be provided with controls allowing the user to make an election as to both if and when systems, programs or features described herein may enable the collection of user information (e.g., information about a user's social network, social actions or activities, profession, a user's preferences, or a user's current location), and if the user is sent content or communications from a server. In addition, certain data may be treated in one or more ways before it is stored or used, so that personally identifiable information is removed. For example, a user's identity may be treated so that no personally identifiable information can be determined for the user, or a user's geographic location may be generalized where location information is obtained (such as to a city, ZIP code, or state level), so that a particular location of a user cannot be determined. Thus, the user may have control over what information is collected about the user, how that information is used, and what information is provided to the user.

CONCLUSION

This disclosure describes techniques for answering queries that can include multiple reasonable answers derived from different corpora. The techniques incorporate information from the different corpora and presents it in a manner that obviates the need for a user to understand finer distinctions between the corpora. Effectively, the techniques provide a *compound response* that is stitched together from available facts, related news stories, and other sources of information to cover the user's information needs.